REMARKS

The Office Action of December 22, 2010 has been received and its contents carefully considered. Furthermore, the Examiner is thanked for discussing this application during a telephone interview on May 4, 2011. During this interview, applicant's attorney summarized some of the features disclosed in the present application and also discussed the Suzaki and Cox et al references. Applicant's attorney also proposed claim changes, but no agreements were reached.

The present Amendment revises all of the independent claims, as will be discussed in more detail below. An RCE is being filed concurrently to permit further prosecution.

The Present Application

Some of the features disclosing the present application will be summarized below:

The application is directed to watermarking a document. Dots are arranged in waves, as in Figure 3. Figure 3 shows a "signal unit" A and a "signal unit" B, which can be interpreted as 0 and 1. The signal units are then grouped together in "unit images." For example, Figure 7(1) shows image units in which four signal units of the same value are grouped together.

Figure 9 shows a matrix. Unit images in the top row designate the data code length. In this example, the data code length is 12. In the remaining rows, the data code is repeated in a concatenated manner, from the LSB to the MSB.

Now, on to the second embodiment. Here, the 0 bits of the data code are represented by a pseudo-random number and the 1 bits are represented by same pseudo-random number in inverted form. An example is shown in Figure 26. The individual bits of the pseudo-random number and the inverted pseudo-random number are represented by unit images. The data code, expanded by the use of a pseudo-random number and its inverse, are concatenated as in the first embodiment (see Figure 9). The use of PN codes in this manner increases reading accuracy if the document is folded or stretched (see paragraph [0208]).

When the image is read, the PN code is staggered bit by bit with respect to the image. When the correlation between the PN code and the image exceeds a threshold, as in Figure 27, a 0 in the data code has been and this establishes the position of the embedded watermark.

In Figure 28, PN code series A and B are used. Here, "series" means the series of bits of a PN code.

Figure 30 shows the use of a two-dimensional PN code and Figure 33 shows the use of a three-dimensional PN code.

Rejection of the Independent Claims

The Office Action rejects all of the independent claims for obviousness based on Suzaki and Cox et al (which will hereafter be called simply "Cox" for short).

Suzaki is directed to watermarking using dots arranged in waves with different directions. Cox is directed to watermarking data such as images and video. Figure 1 of Cox includes a PN-mapper 11, "which maps each symbol of the encoded watermark into a pre-specified pseudo-random noise (PN) code" (column 6, lines 45-48).

Claim Changes

An important difference between applicant's arrangement and Suzaki modified by Cox is that Cox uses one PN code for each symbol. In contrast, applicant's arrangement uses two or more PN codes, with one of these PN codes being assigned to each row or column. The present Amendment revises the independent claims to emphasize this distinction.

For example, independent claim 2 now recites that a watermark generating section "uses the plurality of PN code sequences so as to diffuse units of watermark information by assigning one of the PN code sequences to all of a row or column and assigning another of the PN code sequences to all of another row or column." Independent claim 8 recites that "a first one of the PN code sequences is used ... to calculate correlation values for all of a first row or column and a second one of the PN code sequences is used ... to calculate

correlation values for all of a second row or column." The rest of the independent claims have been amended along the lines of claim 2 or claim 8.
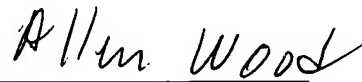
Since Cox assigns a different PN code for each symbol, it is respectfully submitted that Cox would not have provided a motivation for an ordinarily skilled person to modify Suzaki so as to assign a PN code to all of a row or column and to assign a different PN code to all of another row or column. Accordingly, it is respectfully submitted that the inventions defined by the independent claims, along with their dependent claims, are patentable over Suzaki and Cox.

The present Amendment also revises claims 2 and 5 to correct the informalities noted in sections 9 and 10 of the Office Action. Accordingly, the objections should be withdrawn.

Conclusion:

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. Reconsideration of the application is therefore is respectfully requested.

Respectfully submitted,

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